Ensuring Safety

In March of 2005, we changed our normal lake operations in an attempt to keep high lake levels (typically in the spring) from occurring. High lake levels can make seepage worse by increasing pressure on the dam. We have also increased the frequency and intensity of our dam monitoring efforts. The Nashville District recently began repairs on the Wolf Creek Dam. In January 2007, construction began on a modern "grout curtain." The dam is increasingly safer as the grout is placed. A permanent concrete wall is being designed that will be longer and deeper than a previous wall installed in the 1970's. Construction will begin on the wall in 2008 and last up to six years. The new wall will ensure the long-term safety of the dam.

Additional Lake Lowering

Although we believe the fix is a timely one, we recently began several risk-based studies to identify additional ways to lower risk while the fix is underway. In January 2007, the Corps made the decision, based on public health and safety concerns, to lower the lake to elevation 680. The lake level and increased protection from construction progress will be reevaluated in the fall of 2007.

What Can You Do?

If you live near the Cumberland River or one of its major tributaries, check to see if your property lies within a designated dam failure flooded area shown on maps available at your County Emergency Management office, the Corps offices and at many public libraries (as listed on our website). If you are in or near a designated flood area, you may:

- Purchase a weather band radio for early warning
- Have a plan for evacuation of your family to a designated gathering place
- Practice your evacuation plan
- Secure your property by locking doors and outbuildings upon departure
- Establish a contact person or persons outside the flood area for check-in
- Consider purchasing flood insurance (strictly a personal choice)

Phone: 615-736-7161
Fax: 615-736-7065
Bill Peoples - Chief, Public Affairs
E-mail: William.L.Peoples@usace.army.mil
Dave Hendrix - Project Manager
E-mail: John.D.Hendrix@usace.army.mil
Larry Craig - Power Project Manager (270) 343-0123
Sammy Alley - Power Plant Supt. (270) 343-0123
Craig Shoe - Resource Manager (606) 679-6337

For project updates and to monitor the construction progress, you may access the Corps website at:
http://www.lrn.usace.army.mil/pao/issues/WOLcommo/

US Army Corps of Engineers®
Nashville District

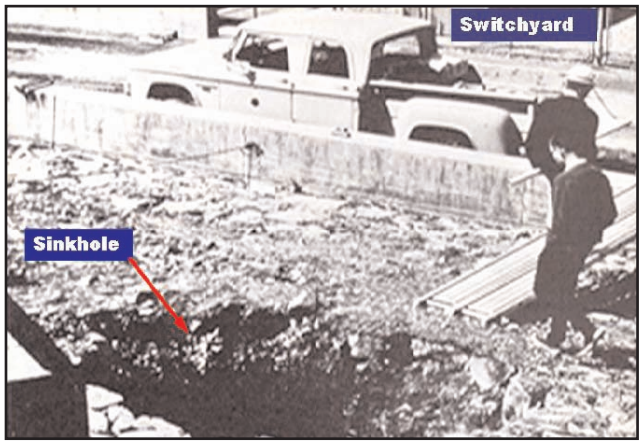
One Team: Relevant, Ready, Responsive, and Reliable

Wolf Creek Dam

Construction of Wolf Creek Dam on the Cumberland River near Jamestown, Kentucky began in the 1940's for flood damage reduction and for hydropower production. It was completed in 1952. Lake Cumberland was created by the dam and is the largest manmade reservoir east of the Mississippi River. Wolf Creek Dam is over a mile long and provides a maximum flood storage capacity of over 6 million acre-feet (an acre-foot is a volume that is 1 acre large and 1 foot deep or 325,850 gallons). The lake provides over 40% of the total flood storage in the Cumberland River basin and the project produces 22% of the hydropower generated on the Cumberland River. Recreational opportunities abound at the lake, which receives more visitors (over 4 million) each year than Yellowstone Park.

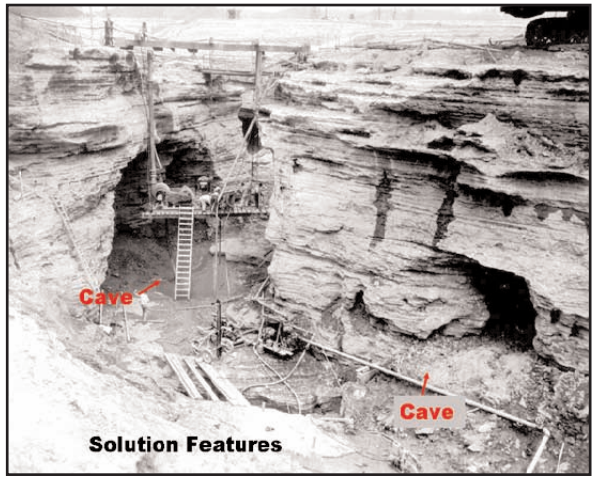
Wolf Creek Dam Seepage Problems and Solutions

In 1968, muddy flows below the dam and two sinkholes near the downstream end of the earthen dam signaled serious reservoir seepage problems. (Seepage is the movement of water through and under the dam). Some seepage is normal, but an increase can lead to progressive erosion of the earthen dam. This erosion is called "piping". In 1968, investigations concluded active seepage and piping were due to the type of rock in the foundation of the dam. The rock is limestone with numerous connected fractures and joints. The soil



material in these cracks had slowly washed out, causing collapse of earthen materials and embankment into the spaces where the soil had been.

The District immediately began an emergency grouting program between 1968 and 1970 to fill the voids. (The grout is a mixture of sand, cement and water which can be pumped under pressure through small pipes deep into the dam to fill any voids). The grout filled the voids and stopped the progression of piping; however, grouting was not believed to be a long-term fix. After studying numerous alternatives, the District chose to construct a concrete diaphragm wall to block the seepage. This wall was built through two-thirds of the length of the earth embankment and into the rock foundation between 1975 and 1979.



The foundation of Wolf Creek Dam has karst geology indicated here by caves.

Since completion of the wall, District personnel have continued to monitor the project closely and in recent years have noted persistent and increasing wet areas downstream. Exploratory drilling has encountered soft, wet material in the embankment near the foundation. Also in several areas of the foundation, instruments have shown a slow increase in water pressure. These signs all indicate that new voids and water passages have opened. The original wall interrupted the progression of erosion, however, seepage has since found new paths under and around the wall and perhaps through small openings in the wall as erosion of solution features continues.

In 2005, the District completed a Major Rehabilitation Report to evaluate ways to stop the progression of seepage and improve the long-term reliability of the dam. The recommendation is a new concrete diaphragm wall constructed using innovative technology that will reinforce the function of the original wall. This new wall will start near where the concrete and earthen parts of the dam meet and will run the

January 2007 grouting operation at the earthen embankment

entire length of the earthen dam, 1,650 feet farther than the existing wall. The new wall will extend deeper than the deepest sections of the original wall and as much as 75 feet deeper than most of the original wall. The cost is estimated at $300 million, and the plan is to complete the wall by 2014. The Corps of Engineers has established Wolf Creek Dam rehabilitation as a top priority and is committed to continual funding.